

# SEQUENCE LISTING

<110> De Sauvage, Frederic J.  
Klein, Richard D.  
Rosenthal, Arnon  
Phillips, Heidi S.

<120> GFRALPHA3 AND ITS USES

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<140> 09/272,835

<141> 1999-03-19

<150> 60/079,124

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<213> Mus musculus

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gccagaaaga aatgcgaggc taatcccgtg tgcaaggctg cctaccagca cctggggtcc 240
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<211> 498

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<211> 397

<212> PRT

<213> Mus musculus

<400> 5

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Thr	Glu	Asn	Arg	Phe	Val	Asn	Ser	Cys	Thr	Gln	Ala	Arg	Lys	Lys	Cys
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Glu	Ala	Asn	Pro	Ala	Cys	Lys	Ala	Ala	Tyr	Gln	His	Leu	Gly	Ser	Cys
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Thr	Ser	Ser	Leu	Ser	Arg	Pro	Leu	Pro	Leu	Glu	Glu	Ser	Ala	Met	Ser
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Ala	Asp	Cys	Leu	Glu	Ala	Ala	Glu	Gln	Leu	Arg	Asn	Ser	Ser	Leu	Ile
				85					90					95	
Asp	Cys	Arg	Cys	His	Arg	Arg	Met	Lys	His	Gln	Ala	Thr	Cys	Leu	Asp
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Ile	Tyr	Trp	Thr	Val	His	Pro	Ala	Arg	Ser	Leu	Gly	Asp	Tyr	Glu	Leu
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Asp	Val	Ser	Pro	Tyr	Glu	Asp	Thr	Val	Thr	Ser	Lys	Pro	Trp	Lys	Met
	130					135					140				
Asn	Leu	Ser	Lys	Leu	Asn	Met	Leu	Lys	Pro	Asp	Ser	Asp	Leu	Cys	Leu
145					150					155					160
Lys	Phe	Ala	Met	Leu	Cys	Thr	Leu	His	Asp	Lys	Cys	Asp	Arg	Leu	Arg
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Lys	Ala	Tyr	Gly	Glu	Ala	Cys	Ser	Gly	Ile	Arg	Cys	Gln	Arg	His	Leu
			180					185					190		
Cys	Leu	Ala	Gln	Leu	Arg	Ser	Phe	Glu	Lys	Ala	Ala	Glu	Ser	His	
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Tyr	Leu	Gly	Leu	Ile	Gly	Thr	Ala	Met	Thr	Pro	Asn	Phe	Ile	Ser	Lys
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Val	Asn	Thr	Thr	Val	Ala	Leu	Ser	Cys	Thr	Cys	Arg	Gly	Ser	Gly	Asn
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Cys	Leu	Val	Glu	Ala	Ile	Ala	Ala	Lys	Met	Arg	Phe	His	Arg	Gln	Leu
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<400> 6

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Gln	Lys	Ser	Leu	Tyr	Asn	Cys	Arg	Cys	Lys	Arg	Gly	Met	Lys	Lys	Glu
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				165					170					175	
Val	Ser	Asn	Asp	Val	Cys	Asn	Arg	Arg	Lys	Cys	His	Lys	Ala	Leu	Arg
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Gln	Phe	Phe	Asp	Lys	Val	Pro	Ala	Lys	His	Ser	Tyr	Gly	Met	Leu	Phe
	195				200							205			
Cys	Ser	Cys	Arg	Asp	Ile	Ala	Cys	Thr	Glu	Arg	Arg	Arg	Gln	Thr	Ile
	210				215						220				
Val	Pro	Val	Cys	Ser	Tyr	Glu	Glu	Arg	Glu	Lys	Pro	Asn	Cys	Leu	Asn
225				230						235				240	
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				245				250						255	
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Leu	Lys	Phe	Leu	Asn	Phe	Phe	Lys	Asp	Asn	Thr	Cys	Leu	Lys	Asn	Ala
				325					330					335	
Ile	Gln	Ala	Phe	Gly	Asn	Gly	Ser	Asp	Val	Thr	Val	Trp	Gln	Pro	Ala
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Lys	Asn	Lys	Pro	Leu	Gly	Pro	Ala	Gly	Ser	Glu	Asn	Glu	Ile	Pro	Thr
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				405					410					415	
Lys	Glu	Gly	Leu	Gly	Ala	Ser	Ser	His	Ile	Thr	Thr	Lys	Ser	Met	Ala
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Ala	Pro	Pro	Ser	Cys	Gly	Leu	Ser	Pro	Leu	Leu	Val	Leu	Val	Val	Thr



Ser Phe Gln Ala Thr Gln Ala Pro Arg Val Glu Lys Thr Pro Ser Leu  
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 385 390 395 400  
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 405 410 415  
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 420 425 430  
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 <212> PRT  
 <213> Rattus norvegicus

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 35 40 45  
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 Gly Leu Glu Ala Lys Asp Glu Cys Arg Ser Ala Met Glu Ala Leu Lys  
 65 70 75 80  
 Gln Lys Ser Leu Tyr Asn Cys Arg Cys Lys Arg Gly Met Lys Lys Glu  
 85 90 95  
 Lys Asn Cys Leu Arg Ile Tyr Trp Ser Met Tyr Gln Ser Leu Gln Gly  
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 115 120 125  
 Ser Asp Ile Phe Arg Ala Val Pro Phe Ile Ser Asp Val Phe Gln Gln  
 130 135 140  
 Val Glu His Ile Ser Lys Gly Asn Asn Cys Leu Asp Ala Ala Lys Ala  
 145 150 155 160  
 Cys Asn Leu Asp Asp Thr Cys Lys Lys Tyr Arg Ser Ala Tyr Ile Thr  
 165 170 175  
 Pro Cys Thr Thr Ser Met Ser Asn Glu Val Cys Asn Arg Arg Lys Cys  
 180 185 190  
 His Lys Ala Leu Arg Gln Phe Phe Asp Lys Val Pro Ala Lys His Ser  
 195 200 205  
 Tyr Gly Met Leu Phe Cys Ser Cys Arg Asp Ile Ala Cys Thr Glu Arg  
 210 215 220  
 Arg Arg Gln Thr Ile Val Pro Val Cys Ser Tyr Glu Glu Arg Glu Arg  
 225 230 235 240  
 Pro Asn Cys Leu Ser Leu Gln Asp Ser Cys Lys Thr Asn Tyr Ile Cys  
 245 250 255  
 Arg Ser Arg Leu Ala Asp Phe Phe Thr Asn Cys Gln Pro Glu Ser Arg  
 260 265 270  
 Ser Val Ser Asn Cys Leu Lys Glu Asn Tyr Ala Asp Cys Leu Leu Ala  
 275 280 285  
 Tyr Ser Gly Leu Ile Gly Thr Val Met Thr Pro Asn Tyr Val Asp Ser

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	325		330	335
Cys Leu Lys Asn Ala Ile Gln Ala Phe Gly Asn Gly Ser Asp Val Thr				
	340		345	350
Met Trp Gln Pro Ala Pro Pro Val Gln Thr Thr Thr Ala Thr Thr Thr				
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Thr Ala Phe Arg Val Lys Asn Lys Pro Leu Gly Pro Ala Gly Ser Glu				
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Asn Glu Ile Pro Thr His Val Leu Pro Pro Cys Ala Asn Leu Gln Ala				
385		390		395
Gln Lys Leu Lys Ser Asn Val Ser Gly Ser Thr His Leu Cys Leu Ser				
	405		410	415
Asp Ser Asp Phe Gly Lys Asp Gly Leu Ala Gly Ala Ser Ser His Ile				
	420		425	430
Thr Thr Lys Ser Met Ala Ala Pro Pro Ser Cys Ser Leu Ser Ser Leu				
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Pro Val Leu Met Leu Thr Ala Leu Ala Ala Leu Leu Ser Val Ser Leu				
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<211> 464

<212> PRT

<213> Rattus Norvegicus

<400> 9

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Gly Trp Arg Pro Gln Val Asp Cys Val Arg Ala Asn Glu Leu Cys Ala				
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Ala Glu Ser Asn Cys Ser Ser Arg Tyr Arg Thr Leu Arg Gln Cys Leu				
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Ala Gly Arg Asp Arg Asn Thr Met Leu Ala Asn Lys Glu Cys Gln Ala				
65	70	75	80	
Ala Leu Glu Val Leu Gln Glu Ser Pro Leu Tyr Asp Cys Arg Cys Lys				
	85	90	95	
Arg Gly Met Lys Lys Glu Leu Gln Cys Leu Gln Ile Tyr Trp Ser Ile				
	100	105	110	
His Leu Gly Leu Thr Glu Gly Glu Glu Phe Tyr Glu Ala Ser Pro Tyr				
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Glu Pro Val Thr Ser Arg Leu Ser Asp Ile Phe Arg Leu Ala Ser Ile				
	130	135	140	
Phe Ser Gly Thr Gly Thr Asp Pro Ala Val Ser Thr Lys Ser Asn His				
145	150	155	160	
Cys Leu Asp Ala Ala Lys Ala Cys Asn Leu Asn Asp Asn Cys Lys Lys				
	165	170	175	
Leu Arg Ser Ser Tyr Ile Ser Ile Cys Asn Arg Glu Ile Ser Pro Thr				
	180	185	190	
Glu Arg Cys Asn Arg Arg Lys Cys His Lys Ala Leu Arg Glu Phe Phe				
	195	200	205	

Asp	Arg	Val	Pro	Ser	Glu	Tyr	Thr	Tyr	Arg	Met	Leu	Phe	Cys	Ser	Cys
210						215					220				
Gln	Asp	Gln	Ala	Cys	Ala	Glu	Arg	Arg	Arg	Gln	Thr	Ile	Leu	Pro	Ser
225					230					235					240
Cys	Ser	Tyr	Glu	Asp	Lys	Glu	Lys	Pro	Asn	Cys	Leu	Asp	Leu	Arg	Ser
				245					250						255
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			260					265						270	
Ala	Asn	Cys	Arg	Ala	Ser	Tyr	Arg	Thr	Ile	Thr	Ser	Cys	Pro	Ala	Asp
	275						280					285			
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	290					295					300				
Met	Thr	Pro	Asn	Tyr	Val	Asp	Ser	Asn	Pro	Thr	Gly	Ile	Val	Val	Ser
305					310					315					320
Pro	Trp	Cys	Asn	Cys	Arg	Gly	Ser	Gly	Asn	Met	Glu	Glu	Glu	Cys	Glu
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Lys	Phe	Leu	Arg	Asp	Phe	Thr	Glu	Asn	Pro	Cys	Leu	Arg	Asn	Ala	Ile
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Gln	Ala	Phe	Gly	Asn	Gly	Thr	Asp	Val	Asn	Met	Ser	Pro	Lys	Gly	Pro
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Ser	Leu	Pro	Ala	Thr	Gln	Ala	Pro	Arg	Val	Glu	Lys	Thr	Pro	Ser	Leu
	370					375					380				
Pro	Asp	Asp	Leu	Ser	Asp	Ser	Thr	Ser	Leu	Gly	Thr	Ser	Val	Ile	Thr
385					390					395					400
Thr	Cys	Thr	Ser	Ile	Gln	Glu	Gln	Gly	Leu	Lys	Ala	Asn	Asn	Ser	Lys
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Glu	Leu	Ser	Met	Cys	Phe	Thr	Glu	Leu	Thr	Thr	Asn	Ile	Ser	Pro	Gly
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Ser	Lys	Lys	Val	Ile	Lys	Leu	Asn	Ser	Gly	Ser	Ser	Arg	Ala	Arg	Leu
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 <213> Homo sapiens

<220>

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 cccctgaacc cgcgaccgct gccgcccgtg gnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 180  
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 <212> DNA  
 <213> Homo sapiens



<400> 11  
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20

<210> 12  
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21

<210> 13  
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atgaacagct gtctccaggc caggaggaag tgccaggctg atcccacctg cagtgtctgcc 180  
taccaccacc tggattcctg cacctctagc ataagcacc cactgccctc agaggagcct 240  
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tgcatgtgcc accggcgcat gaagaaccag gttgcctgct tggacatcta ttggaccgtt 360  
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accagcaaac cctggaaaat gaatctcagc aaactgaaca tgctcaaacc agactcagac 480  
ctctgectca agtttgccat gctgtgtact ctcaatgaca agtgtgaccg gctgcgcaag 540  
gcctacgggg aggcgtgctc cgggccccac tgccagcgcc acgtctgctt caggcagctg 600  
ctcactttct tcgagaaggc cgccgagccc cagcgcgagg gcctgctact gtgcccattg 660  
gcccccaacg accggggctg cggggagcgc cggcgcaaca ccacgcccc caactgcgcg 720  
ctgcgcctg tggcccccaa ctgcctggag ctgcggcgcc tctgcttctc cgaccgctt 780  
tgcagatcac gcctggtgga tttccagacc cactgccatc ccattggacat cctaggaact 840  
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acccccaaact ttgtcagcaa tgtcaacacc agtgttgct taagctgcac ctgccgaggc 960  
agtggcaacc tgcaggagga gtgtgaaatg ctggaagggt tcttctccca caaccctgc 1020  
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ccacacccta cctttgctgt gatggcacac cagaatgaaa accctgctgt gaggccacag 1140  
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tagctggact tccccagggc cctcttcccc tccaccacac ccagggtggac ttgcagccca 1260  
caaggggtga ggaaaggaca gcagcaggaa ggagggtgag tgcgcagatg agggcacagg 1320  
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atctccactt ctgattcatg ctgcccctcc ttggtggcca caatttagcc atgtcatctg 1440  
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agaatctaata aggttagcct ttctctattg cattccagat taggggttagg gtaggaggga 1560  
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cctgccgaac atctgggcat caggagctgg agcctgtggg ccttgcttta ttctattat 1740  
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<210> 15

<211> 400  
 <212> PRT  
 <213> Homo Sapiens

<400> 15

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Leu	Leu	Leu	Leu	Leu	Pro	Pro	Ser	Pro	Leu	Pro	Leu	Ala	Ala	Gly	Asp
			20					25					30		
Pro	Leu	Pro	Thr	Glu	Ser	Arg	Leu	Met	Asn	Ser	Cys	Leu	Gln	Ala	Arg
		35					40					45			
Arg	Lys	Cys	Gln	Ala	Asp	Pro	Thr	Cys	Ser	Ala	Ala	Tyr	His	His	Leu
	50					55					60				
Asp	Ser	Cys	Thr	Ser	Ser	Ile	Ser	Thr	Pro	Leu	Pro	Ser	Glu	Glu	Pro
65					70					75					80
Ser	Val	Pro	Ala	Asp	Cys	Leu	Glu	Ala	Ala	Gln	Gln	Leu	Arg	Asn	Ser
				85					90					95	
Ser	Leu	Ile	Gly	Cys	Met	Cys	His	Arg	Arg	Met	Lys	Asn	Gln	Val	Ala
			100					105					110		
Cys	Leu	Asp	Ile	Tyr	Trp	Thr	Val	His	Arg	Ala	Arg	Ser	Leu	Gly	Asn
		115				120						125			
Tyr	Glu	Leu	Asp	Val	Ser	Pro	Tyr	Glu	Asp	Thr	Val	Thr	Ser	Lys	Pro
	130					135					140				
Trp	Lys	Met	Asn	Leu	Ser	Lys	Leu	Asn	Met	Leu	Lys	Pro	Asp	Ser	Asp
145					150					155					160
Leu	Cys	Leu	Lys	Phe	Ala	Met	Leu	Cys	Thr	Leu	Asn	Asp	Lys	Cys	Asp
				165					170					175	
Arg	Leu	Arg	Lys	Ala	Tyr	Gly	Glu	Ala	Cys	Ser	Gly	Pro	His	Cys	Gln
			180					185					190		
Arg	His	Val	Cys	Leu	Arg	Gln	Leu	Leu	Thr	Phe	Phe	Glu	Lys	Ala	Ala
	195					200						205			
Glu	Pro	His	Ala	Gln	Gly	Leu	Leu	Leu	Cys	Pro	Cys	Ala	Pro	Asn	Asp
	210					215					220				
Arg	Gly	Cys	Gly	Glu	Arg	Arg	Asn	Thr	Ile	Ala	Pro	Asn	Cys	Ala	
225					230				235					240	
Leu	Pro	Pro	Val	Ala	Pro	Asn	Cys	Leu	Glu	Leu	Arg	Arg	Leu	Cys	Phe
				245					250					255	
Ser	Asp	Pro	Leu	Cys	Arg	Ser	Arg	Leu	Val	Asp	Phe	Gln	Thr	His	Cys
		260						265					270		
His	Pro	Met	Asp	Ile	Leu	Gly	Thr	Cys	Ala	Thr	Glu	Gln	Ser	Arg	Cys
	275						280					285			
Leu	Arg	Ala	Tyr	Leu	Gly	Leu	Ile	Gly	Thr	Ala	Met	Thr	Pro	Asn	Phe
	290					295					300				
Val	Ser	Asn	Val	Asn	Thr	Ser	Val	Ala	Leu	Ser	Cys	Thr	Cys	Arg	Gly
305					310					315					320
Ser	Gly	Asn	Leu	Gln	Glu	Glu	Cys	Glu	Met	Leu	Glu	Gly	Phe	Phe	Ser
				325					330					335	
His	Asn	Pro	Cys	Leu	Thr	Glu	Ala	Ile	Ala	Ala	Lys	Met	Arg	Phe	His
		340						345					350		
Ser	Gln	Leu	Phe	Ser	Gln	Asp	Trp	Pro	His	Pro	Thr	Phe	Ala	Val	Met
		355					360					365			
Ala	His	Gln	Asn	Glu	Asn	Pro	Ala	Val	Arg	Pro	Gln	Pro	Trp	Val	Pro
	370					375					380				
Ser	Leu	Phe	Ser	Cys	Thr	Leu	Pro	Leu	Ile	Leu	Leu	Leu	Ser	Leu	Trp
385					390					395					400

<210> 16  
 <211> 1837  
 <212> DNA  
 <213> Homo sapeins

<400> 16  
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 ggtgcccggc gagggagccc cgctctcaga gctccagggg aggagcgagg ggagcgcgga 120  
 gcccggcgcc tacagctcgc catggtgcgc cccctgaacc cgcgaccgct gccgccccta 180  
 gtccctgatgt tgetgctgct gctgcccgcg tcgcccgtgc ctctcgcagc cggagacccc 240  
 cttccacacag aaagccgact catgaacagc tgtctccagg ccaggaggaa gtgccaggct 300  
 gatccacact gcagtgtgct ctaccaccac ctggattcct gcacctctag cataagcacc 360  
 ccaactgccct cagaggagcc ttccggtccct gctgactgcc tggaggcagc acagcaactc 420  
 aggaacagct ctctgatagg ctgcatgtgc caccggcgca tgaagaacca gggtgcctgc 480  
 ttggacatct attggaccgt tcaccgtgct cgcagccttg actcagacct ctgcctcaag 540  
 tttgccatgc tgtgtactct caatgacaag tgtgaccggc tgcgcaaggc ctacggggag 600  
 gcgtgctccg ggccccactg ccagcgccac gctgacctca ggcagctgct caactttctt 660  
 gagaaggccg ccgagcccca cgcgaggggc ctgctactgt gccatgtgc cccaacgcag 720  
 cggggctgctg gggagcgccg gcgcaacacc atcgccccca actgcgcgct gccgctgtg 780  
 gcccccaact gcctggagct gcggcgccctc tgccttctccg acccgctttg cagatcacgc 840  
 ctggtggatt tccagaccca ctgccatccc atggacatcc taggaacttg tgcaacagag 900  
 cagtccagat gtctacgagc atacctgggg ctgattggga ctgccatgac cccaacttt 960  
 gtcagcaatg tcaacaccag tgttgcccta agctgcacct gccgaggcag tggcaacctg 1020  
 caggaggagt gtgaaatgct ggaagggttc ttctcccaca acccctgcct cacggaggcc 1080  
 attgcagcta agatgcgttt tcacagccaa ctcttctccc aggactggcc acaccctacc 1140  
 tttgctgtga tggcacacca gaatgaaac cctgctgtga ggccacagcc ctgggtgccc 1200  
 tctcttttct cctgcacgct tcccttgatt ctgctcctga gcctatggta gctggacttc 1260  
 cccaggggccc tcttcccctc caccacaccc aggtggactt gcagcccaca aggggtgagg 1320  
 aaaggacagc agcaggaagg aggtgcagtg cgcagatgag ggcacaggag aagctaaggg 1380  
 ttatgacctc cagatcctta ctgggtccagt cctcattccc tccaccccat ctccacttct 1440  
 gattcatgct gcccctcctt ggtggccaca atttagccat gtcattctgg ggtgaccagc 1500  
 tccaccaagc ccctttctga gcccttctctc ttgactacca ggatcaccag aatctaataa 1560  
 gttagccttt ctctattgca ttccagatta ggggttaggg agggaggact ggggtgttctg 1620  
 aggcagccta gaaagtcatt ctcccttctg aagaaggctc ctgccccctc gtctcctcct 1680  
 ctgagtgagg gatggaaaac tactgcctgc actgccctgt ccccgatcc tgccgaacat 1740  
 ctgggcatca ggagctggag cctgtgggccc ttgctttatt cctattattg tcctaaagtc 1800  
 tctctgggct cttggatcat gattaaacct ttgactt 1837

<210> 17  
 <211> 369  
 <212> PRT  
 <213> Homo sapiens

<400> 17  
 Met Val Arg Pro Leu Asn Pro Arg Pro Leu Pro Pro Val Val Leu Met  
 1 5 10 15  
 Leu Leu Leu Leu Leu Pro Pro Ser Pro Leu Pro Leu Ala Ala Gly Asp  
 20 25 30  
 Pro Leu Pro Thr Glu Ser Arg Leu Met Asn Ser Cys Leu Gln Ala Arg  
 35 40 45  
 Arg Lys Cys Gln Ala Asp Pro Thr Cys Ser Ala Ala Tyr His His Leu  
 50 55 60  
 Asp Ser Cys Thr Ser Ser Ile Ser Thr Pro Leu Pro Ser Glu Glu Pro  
 65 70 75 80  
 Ser Val Pro Ala Asp Cys Leu Glu Ala Ala Gln Gln Leu Arg Asn Ser  
 85 90 95  
 Ser Leu Ile Gly Cys Met Cys His Arg Arg Met Lys Asn Gln Val Ala



				85					90					95	
Ser	Leu	Ile	Gly	Cys	Met	Cys	His	Arg	Arg	Met	Lys	Asn	Gln	Val	Ala
			100						105				110		
Cys	Leu	Asp	Ile	Tyr	Trp	Thr	Val	His	Arg	Ala	Arg	Ser	Leu	Gly	Asn
		115					120					125			
Tyr	Glu	Leu	Asp	Val	Ser	Pro	Tyr	Glu	Asp	Thr	Val	Thr	Ser	Lys	Pro
	130					135					140				
Trp	Lys	Met	Asn	Leu	Ser	Lys	Leu	Asn	Met	Leu	Lys	Pro	Asp	Ser	Asp
145					150					155					160
Leu	Cys	Leu	Lys	Phe	Ala	Met	Leu	Cys	Thr	Leu	Asn	Asp	Lys	Cys	Asp
			165						170						175
Arg	Leu	Arg	Lys	Ala	Tyr	Gly	Glu	Ala	Cys	Ser	Gly	Pro	His	Cys	Gln
			180						185				190		
Arg	His	Val	Cys	Leu	Arg	Gln	Leu	Leu	Thr	Phe	Phe	Glu	Lys	Ala	Ala
		195				200						205			
Glu	Pro	His	Ala	Gln	Gly	Leu	Leu	Leu	Cys	Pro	Cys	Ala	Pro	Asn	Asp
	210					215					220				
Arg	Gly	Cys	Gly	Glu	Arg	Arg	Arg	Asn	Thr	Ile	Ala	Pro	Asn	Cys	Ala
225					230					235					240
Leu	Pro	Pro	Val	Ala	Pro	Asn	Cys	Leu	Glu	Leu	Arg	Arg	Leu	Cys	Phe
			245						250						255
Ser	Asp	Pro	Leu	Cys	Arg	Ser	Arg	Leu	Val	Asp	Phe	Gln	Thr	His	Cys
			260						265				270		
His	Pro	Met	Asp	Ile	Leu	Gly	Thr	Cys	Ala	Thr	Glu	Gln	Ser	Arg	Cys
		275					280					285			
Leu	Arg	Ala	Tyr	Leu	Gly	Leu	Ile	Gly	Thr	Ala	Met	Thr	Pro	Asn	Phe
	290					295					300				
Val	Ser	Asn	Val	Asn	Thr	Ser	Val	Ala	Leu	Ser	Cys	Thr	Cys	Arg	Gly
305					310					315					320
Ser	Gly	Asn	Leu	Gln	Glu	Glu	Cys	Glu	Met	Leu	Glu	Gly	Phe	Phe	Ser
			325						330						335
His	Asn	Pro	Cys	Leu	Thr	Glu	Ala	Ile	Ala	Ala	Lys	Met	Arg	Phe	His
			340						345				350		
Ser	Gln	Leu	Phe	Ser	Gln	Asp	Trp	Pro	His	Pro	Thr	Phe	Ala	Val	Met
		355				360						365			
Ala	His	Gln	Asn	Glu	Asn	Pro	Ala	Val	Arg	Pro	Gln	Pro	Trp	Val	Pro
	370					375					380				
Ser	Leu	Phe	Ser	Cys	Thr	Leu	Pro	Leu	Ile	Leu	Leu	Leu	Ser	Leu	Trp
385					390					395					400
Pro	Asp	Lys	Thr	His	Thr	Cys	Pro	Pro	Cys	Pro	Ala	Pro	Glu	Leu	Leu
			405						410						415
Gly	Gly	Pro	Ser	Val	Phe	Leu	Phe	Pro	Pro	Lys	Pro	Lys	Asp	Thr	Leu
			420						425				430		
Met	Ile	Ser	Arg	Thr	Pro	Glu	Val	Thr	Cys	Val	Val	Val	Asp	Val	Ser
		435				440						445			
His	Glu	Asp	Pro	Glu	Val	Lys	Phe	Asn	Trp	Tyr	Val	Asp	Gly	Val	Glu
	450					455					460				
Val	His	Asn	Ala	Lys	Thr	Lys	Pro	Arg	Glu	Glu	Gln	Tyr	Asn	Ser	Thr
465					470					475					480
Tyr	Arg	Val	Val	Ser	Val	Leu	Thr	Val	Leu	His	Gln	Asp	Trp	Leu	Asn
			485						490						495
Gly	Lys	Glu	Tyr	Lys	Cys	Lys	Val	Ser	Asn	Lys	Ala	Leu	Pro	Ala	Pro
			500						505				510		
Ile	Glu	Lys	Thr	Ile	Ser	Lys	Ala	Lys	Gly	Gln	Pro	Arg	Glu	Pro	Gln
	515						520					525			
Val	Tyr	Thr	Leu	Pro	Pro	Ser	Arg	Glu	Glu	Met	Thr	Lys	Asn	Gln	Val
	530					535					540				

Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val  
 545 550 555 560  
 Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn Tyr Lys Thr Thr Pro  
 565 570 575  
 Pro Val Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr  
 580 585 590  
 Val Asp Lys Ser Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val  
 595 600 605  
 Met His Glu Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu  
 610 615 620  
 Ser Pro Gly Lys  
 625

<210> 19  
 <211> 951  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Chimeric receptor comprising rat sequence.

<400> 19  
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 1 5 10 15  
 Ile Val Gly Leu His Gly Val Arg Gly Lys Tyr Ala Leu Ala Asp Ala  
 20 25 30  
 Ser Leu Lys Met Ala Asp Pro Asn Arg Phe Arg Gly Lys Asp Leu Pro  
 35 40 45  
 Val Leu Asp Gln Leu Leu Glu Pro Ser Ser Leu Gln Gly Ser Glu Leu  
 50 55 60  
 His Gly Trp Arg Pro Gln Val Asp Cys Val Arg Ala Asn Glu Leu Cys  
 65 70 75 80  
 Ala Ala Glu Ser Asn Cys Ser Ser Arg Tyr Arg Thr Leu Arg Gln Cys  
 85 90 95  
 Leu Ala Gly Arg Asp Arg Asn Thr Met Leu Ala Asn Lys Glu Cys Gln  
 100 105 110  
 Ala Ala Leu Glu Val Leu Gln Glu Ser Pro Leu Tyr Asp Cys Arg Cys  
 115 120 125  
 Lys Arg Gly Met Lys Lys Glu Leu Gln Cys Leu Gln Ile Tyr Trp Ser  
 130 135 140  
 Ile His Leu Gly Leu Thr Glu Gly Glu Glu Phe Tyr Glu Ala Ser Pro  
 145 150 155 160  
 Tyr Glu Pro Val Thr Ser Arg Leu Ser Asp Ile Phe Arg Leu Ala Ser  
 165 170 175  
 Ile Phe Ser Gly Thr Gly Thr Asp Pro Ala Val Ser Thr Lys Ser Asn  
 180 185 190  
 His Cys Leu Asp Ala Ala Lys Ala Cys Asn Leu Asn Asp Asn Cys Lys  
 195 200 205  
 Lys Leu Arg Ser Ser Tyr Ile Ser Ile Cys Asn Arg Glu Ile Ser Pro  
 210 215 220  
 Thr Glu Arg Cys Asn Arg Arg Lys Cys His Lys Ala Leu Arg Gln Phe  
 225 230 235 240  
 Phe Asp Arg Val Pro Ser Glu Tyr Thr Tyr Arg Met Leu Phe Cys Ser  
 245 250 255  
 Cys Gln Asp Gln Ala Cys Ala Glu Arg Arg Arg Gln Thr Ile Leu Pro  
 260 265 270

Ser	Cys	Ser	Tyr	Glu	Asp	Lys	Glu	Lys	Pro	Asn	Cys	Leu	Asp	Leu	Arg
		275					280					285			
Ser	Leu	Cys	Arg	Thr	Asp	His	Leu	Cys	Arg	Ser	Arg	Leu	Ala	Asp	Phe
	290					295					300				
His	Ala	Asn	Cys	Arg	Ala	Ser	Tyr	Arg	Thr	Ile	Thr	Ser	Cys	Pro	Ala
305					310					315				320	
Asp	Asn	Tyr	Gln	Ala	Cys	Leu	Gly	Ser	Tyr	Ala	Gly	Met	Ile	Gly	Phe
			325						330					335	
Asp	Met	Thr	Pro	Asn	Tyr	Val	Asp	Ser	Asn	Pro	Thr	Gly	Ile	Val	Val
			340						345				350		
Ser	Pro	Trp	Cys	Asn	Cys	Arg	Gly	Ser	Gly	Asn	Met	Glu	Glu	Glu	Cys
		355					360					365			
Glu	Lys	Phe	Leu	Arg	Asp	Phe	Thr	Glu	Asn	Pro	Cys	Leu	Arg	Asn	Ala
	370					375					380				
Ile	Gln	Ala	Phe	Gly	Asn	Gly	Thr	Asp	Val	Asn	Met	Ser	Pro	Lys	Gly
385					390					395				400	
Pro	Ser	Leu	Pro	Ala	Thr	Gln	Ala	Pro	Arg	Val	Glu	Lys	Thr	Pro	Ser
				405					410					415	
Leu	Pro	Asp	Asp	Leu	Ser	Asp	Ser	Thr	Ser	Leu	Gly	Thr	Ser	Val	Ile
			420					425					430		
Thr	Thr	Cys	Thr	Ser	Ile	Gln	Glu	Gln	Gly	Leu	Lys	Ala	Asn	Asn	Ser
		435					440					445			
Lys	Glu	Leu	Ser	Met	Cys	Phe	Thr	Glu	Leu	Thr	Thr	Asn	Ile	Ile	Pro
	450					455					460				
Gly	Trp	Arg	Ala	Trp	Val	Pro	Val	Val	Leu	Gly	Val	Leu	Thr	Ala	Leu
465					470					475				480	
Val	Thr	Ala	Ala	Ala	Leu	Ala	Leu	Ile	Leu	Leu	Arg	Lys	Arg	Arg	Lys
				485					490					495	
Glu	Thr	Arg	Phe	Gly	Gln	Ala	Phe	Asp	Ser	Val	Met	Ala	Arg	Gly	Glu
			500					505					510		
Pro	Ala	Val	His	Phe	Arg	Ala	Ala	Arg	Ser	Phe	Asn	Arg	Glu	Arg	Pro
		515					520					525			
Glu	Arg	Ile	Glu	Ala	Thr	Leu	Asp	Ser	Leu	Gly	Ile	Ser	Asp	Glu	Leu
	530					535					540				
Lys	Glu	Lys	Leu	Glu	Asp	Val	Leu	Ile	Pro	Glu	Gln	Gln	Phe	Thr	Leu
545					550					555				560	
Gly	Arg	Met	Leu	Gly	Lys	Gly	Glu	Phe	Gly	Ser	Val	Arg	Glu	Ala	Gln
				565					570					575	
Leu	Lys	Gln	Glu	Asp	Gly	Ser	Phe	Val	Lys	Val	Ala	Val	Lys	Met	Leu
			580					585					590		
Lys	Ala	Asp	Ile	Ile	Ala	Ser	Ser	Asp	Ile	Glu	Glu	Phe	Leu	Arg	Glu
		595					600					605			
Ala	Ala	Cys	Met	Lys	Glu	Phe	Asp	His	Pro	His	Val	Ala	Lys	Leu	Val
	610					615					620				
Gly	Val	Ser													

				725					730					735			
Lys	Trp	Leu	Ala	Leu	Glu	Ser	Leu	Ala	Asp	Asn	Leu	Tyr	Thr	Val	Gln		
			740					745					750				
Ser	Asp	Val	Trp	Ala	Phe	Gly	Val	Thr	Met	Trp	Glu	Ile	Met	Thr	Arg		
		755					760					765					
Gly	Gln	Thr	Pro	Tyr	Ala	Gly	Ile	Glu	Asn	Ala	Glu	Ile	Tyr	Asn	Tyr		
	770					775					780						
Leu	Ile	Gly	Gly	Asn	Arg	Leu	Lys	Gln	Pro	Pro	Glu	Cys	Met	Glu	Asp		
785					790				795						800		
Val	Tyr	Asp	Leu	Met	Tyr	Gln	Cys	Trp	Ser	Ala	Asp	Pro	Lys	Gln	Arg		
				805					810					815			
Pro	Ser	Phe	Thr	Cys	Leu	Arg	Met	Glu	Leu	Glu	Asn	Ile	Leu	Gly	Gln		
			820					825					830				
Leu	Ser	Val	Leu	Ser	Ala	Ser	Gln	Asp	Pro	Leu	Tyr	Ile	Asn	Ile	Glu		
	835						840					845					
Arg	Ala	Glu	Glu	Pro	Thr	Ala	Gly	Gly	Ser	Leu	Glu	Leu	Pro	Gly	Arg		
	850					855					860						
Asp	Gln	Pro	Tyr	Ser	Gly	Ala	Gly	Asp	Gly	Ser	Gly	Met	Gly	Ala	Val		
865					870				875						880		
Gly	Gly	Thr	Pro	Ser	Asp	Cys	Arg	Tyr	Ile	Leu	Thr	Pro	Gly	Gly	Leu		
				885					890					895			
Ala	Glu	Gln	Pro	Gly	Gln	Ala	Glu	His	Gln	Pro	Glu	Ser	Pro	Leu	Asn		
			900					905					910				
Glu	Thr	Gln	Arg	Leu	Leu	Leu	Leu	Gln	Gln	Gly	Leu	Leu	Pro	His	Ser		
	915						920					925					
Ser	Cys	Ala	Asp	Ala	Ser	Leu	Lys	Met	Ala	Asp	Pro	Asn	Arg	Phe	Arg		
	930					935					940						
Gly	Lys	Asp	Leu	Pro	Val	Leu											
945						950											

<210> 20

<211> 888

<212> PRT

<213> Artificial Sequence

<220>

<223> Chimeric receptor comprising murine sequence.

<400> 20

Met	Gly	Gly	Thr	Ala	Ala	Arg	Leu	Gly	Ala	Val	Ile	Leu	Phe	Val	Val		
1				5				10					15				
Ile	Val	Gly	Leu	His	Gly	Val	Arg	Gly	Lys	Tyr	Ala	Leu	Ala	Asp	Ala		
			20					25				30					
Ser	Leu	Lys	Met	Ala	Asp	Pro	Asn	Arg	Phe	Arg	Gly	Lys	Asp	Leu	Pro		
	35						40				45						
Val	Leu	Asp	Gln	Leu	Leu	Glu	Ala	Gly	Asn	Ser	Leu	Ala	Thr	Glu	Asn		
	50					55					60						
Arg	Phe	Val	Asn	Ser	Cys	Thr	Gln	Ala	Arg	Lys	Lys	Cys	Glu	Ala	Asn		
65					70				75						80		
Pro	Ala	Cys	Lys	Ala	Ala	Tyr	Gln	His	Leu	Gly	Ser	Cys	Thr	Ser	Ser		
				85					90					95			
Leu	Ser	Arg	Pro	Leu	Pro	Leu	Glu	Glu	Ser	Ala	Met	Ser	Ala	Asp	Cys		
			100					105					110				
Leu	Glu	Ala	Ala	Glu	Gln	Leu	Arg	Asn	Ser	Ser	Leu	Ile	Asp	Cys	Arg		
		115					120					125					
Cys	His	Arg	Arg	Met	Lys	His	Gln	Ala	Thr	Cys	Leu	Asp	Ile	Tyr	Trp		



130	135	140
Thr Val His Pro Ala Arg Ser Leu Gly Asp Tyr Glu Leu Asp Val Ser		
145	150	155
Pro Tyr Glu Asp Thr Val Thr Ser Lys Pro Trp Lys Met Asn Leu Ser		160
	165	170
Lys Leu Asn Met Leu Lys Pro Asp Ser Asp Leu Cys Leu Lys Phe Ala		175
	180	185
Met Leu Cys Thr Leu His Asp Lys Cys Asp Arg Leu Arg Lys Ala Tyr		190
	195	200
Gly Glu Ala Cys Ser Gly Ile Arg Cys Gln Arg His Leu Cys Leu Ala		205
	210	215
Gln Leu Arg Ser Phe Phe Glu Lys Ala Ala Glu Ser His Ala Gln Gly		220
225	230	235
Leu Leu Leu Cys Pro Cys Pro Pro Glu Asp Ala Gly Cys Gly Glu Arg		240
	245	250
Arg Arg Asn Thr Ile Ala Pro Ser Cys Ala Leu Pro Ser Val Thr Pro		255
	260	265
Asn Cys Leu Asp Leu Arg Ser Phe Cys Arg Ala Asp Pro Leu Cys Arg		270
	275	280
Ser Arg Leu Met Asp Phe Gln Thr His Cys His Pro Met Asp Ile Leu		285
	290	295
Gly Thr Cys Ala Thr Glu Gln Ser Arg Cys Leu Arg Ala Tyr Leu Gly		300
305	310	315
Leu Ile Gly Thr Ala Met Thr Pro Asn Phe Ile Ser Lys Val Asn Thr		320
	325	330
Thr Val Ala Leu Ser Cys Thr Cys Arg Gly Ser Gly Asn Leu Gln Asp		335
	340	345
Glu Cys Glu Gln Leu Glu Arg Ser Phe Ser Gln Asn Pro Cys Leu Val		350
	355	360
Glu Ala Ile Ala Ala Lys Met Arg Phe His Arg Gln Leu Phe Ser Gln		365
	370	375
Asp Trp Ala Asp Ser Thr Phe Ser Val Val Gln Gln Gln Asn Ser Asn		380
385	390	395
Pro Ala Trp Arg Ala Trp Val Pro Val Val Leu Gly Val Leu Thr Ala		400
	405	410
Leu Val Thr Ala Ala Ala Leu Ala Leu Ile Leu Leu Arg Lys Arg Arg		415
	420	425
Lys Glu Thr Arg Phe Gly Gln Ala Phe Asp Ser Val Met Ala Arg Gly		430
	435	440
Glu Pro Ala Val His Phe Arg Ala Ala Arg Ser Phe Asn Arg Glu Arg		445
	450	455
Pro Glu Arg Ile Glu Ala Thr Leu Asp Ser Leu Gly Ile Ser Asp Glu		460
465	470	475
Leu Lys Glu Lys Leu Glu Asp Val Leu Ile Pro Glu Gln Gln Phe Thr		480
	485	490
Leu Gly Arg Met Leu Gly Lys Gly Glu Phe Gly Ser Val Arg Glu Ala		495
	500	505
Gln Leu Lys Gln Glu Asp Gly Ser Phe Val Lys Val Ala Val Lys Met		510
	515	520
Leu Lys Ala Asp Ile Ile Ala Ser Ser Asp Ile Glu Glu Phe Leu Arg		525
	530	535
Glu Ala Ala Cys Met Lys Glu Phe Asp His Pro His Val Ala Lys Leu		540
545	550	555
Val Gly Val Ser Leu Arg Ser Arg Ala Lys Gly Arg Leu Pro Ile Pro		560
	565	570
Met Val Ile Leu Pro Phe Met Lys His Gly Asp Leu His Ala Phe Leu		575
	580	585
		590

Leu Ala Ser Arg Ile Gly Glu Asn Pro Phe Asn Leu Pro Leu Gln Thr  
 595 600 605  
 Leu Ile Arg Phe Met Val Asp Ile Ala Cys Gly Met Glu Tyr Leu Ser  
 610 615 620  
 Ser Arg Asn Phe Ile His Arg Asp Leu Ala Ala Arg Asn Cys Met Leu  
 625 630 635 640  
 Ala Glu Asp Met Thr Val Cys Val Ala Asp Phe Gly Leu Ser Arg Lys  
 645 650 655  
 Ile Tyr Ser Gly Asp Tyr Tyr Arg Gln Gly Cys Ala Ser Lys Leu Pro  
 660 665 670  
 Val Lys Trp Leu Ala Leu Glu Ser Leu Ala Asp Asn Leu Tyr Thr Val  
 675 680 685  
 Gln Ser Asp Val Trp Ala Phe Gly Val Thr Met Trp Glu Ile Met Thr  
 690 695 700  
 Arg Gly Gln Thr Pro Tyr Ala Gly Ile Glu Asn Ala Glu Ile Tyr Asn  
 705 710 715 720  
 Tyr Leu Ile Gly Gly Asn Arg Leu Lys Gln Pro Pro Glu Cys Met Glu  
 725 730 735  
 Asp Val Tyr Asp Leu Met Tyr Gln Cys Trp Ser Ala Asp Pro Lys Gln  
 740 745 750  
 Arg Pro Ser Phe Thr Cys Leu Arg Met Glu Leu Glu Asn Ile Leu Gly  
 755 760 765  
 Gln Leu Ser Val Leu Ser Ala Ser Gln Asp Pro Leu Tyr Ile Asn Ile  
 770 775 780  
 Glu Arg Ala Glu Glu Pro Thr Ala Gly Gly Ser Leu Glu Leu Pro Gly  
 785 790 795 800  
 Arg Asp Gln Pro Tyr Ser Gly Ala Gly Asp Gly Ser Gly Met Gly Ala  
 805 810 815  
 Val Gly Gly Thr Pro Ser Asp Cys Arg Tyr Ile Leu Thr Pro Gly Gly  
 820 825 830  
 Leu Ala Glu Gln Pro Gly Gln Ala Glu His Gln Pro Glu Ser Pro Leu  
 835 840 845  
 Asn Glu Thr Gln Arg Leu Leu Leu Gln Gln Gly Leu Leu Pro His  
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 Ser Ser Cys Ala Asp Ala Ser Leu Lys Met Ala Asp Pro Asn Arg Phe  
 865 870 875 880  
 Arg Gly Lys Asp Leu Pro Val Leu  
 885

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 <212> DNA  
 <213> Homo sapiens

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37

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